IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	VanWinkle T. Townsend	Examiner:	Alex H. Chan
Serial No.:	09/847,751	Group Art Unit:	2633
Filed:	May 2, 2001	Docket No.:	L250.109.101 / FE-00494
Due Date:	**August 6, 2006**		
Title:	TELEMETRY SYSTEM AND METHOD FOR ACOUSTIC ARRAYS		

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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We are transmitting herewith the attached:

☒ Transmittal Sheet containing Certificate of Mailing (1 pg.).
☒ Appeal Brief to the Board of Patent Appeals and Interferences of the U.S. Patent and Trademark Office (30 pgs.).
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Name: Jeff A. Holmen
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CERTIFICATE UNDER 37 C.F.R. 1.8:

The undersigned hereby certifies that this paper or papers, as described herein, are being transmitted via facsimile to Facsimile No. (571) 273-8300 on this 3rd day of **August, 2006**.

By: _____
Name: Jeff A. Holmen

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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Serial No.:	09/847,751	Group Art Unit: 2633	
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APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

This Appeal Brief is submitted in support of the Notice of Appeal filed on June 6, 2006, appealing the final rejection of claims 1-25 of the above-identified application as set forth in the Final Office Action mailed March 7, 2006.

The U.S. Patent and Trademark Office is hereby authorized to charge Deposit Account No. 50-0471 in the amount of $500.00 for filing a Brief in Support of an Appeal as set forth under 37 C.F.R. § 41.20(b)(2). At any time during the pendency of this application, please charge any required fees or credit any overpayment to Deposit Account No. 50-0471.

Appellant respectfully requests consideration and reversal of the Examiner's rejection of pending claims 1-25.

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REAL PARTY IN INTEREST

The intellectual property embodied in the pending application is assigned to Lockheed Martin Corporation.

RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellant that will have a bearing on the Board's decision in the present Appeal.

STATUS OF CLAIMS

In a Final Office Action mailed March 7, 2006, claims 1-25 were finally rejected. Claims 1-25 are pending in the application. Claims 1-25 are the subject of the present Appeal.

STATUS OF AMENDMENTS

No amendments have been entered subsequent to the Final Office Action mailed March 7, 2006. A Response After Final was filed on May 3, 2006, but no amendments to the claims were proposed by Appellants or entered by the Examiner.

SUMMARY OF THE CLAIMED SUBJECT MATTER

Discussions about elements of independent claims 1, 12, and 20 can be found at least at the cited locations in the specification and drawings.

The present invention, as claimed in independent claim 1, provides a telemetry system, including a plurality of acoustic sensors for receiving acoustic information and generating analog signals based on the received acoustic information. A first plurality of subsystems are coupled to at least a subset of the plurality of acoustic sensors. The first plurality of subsystems are configured to receive the analog signals from the acoustic sensors and generate digital values based on the received analog signals. The telemetry system includes a first optical splitter. A first optical transmitter transmits a first set of optical pulses to the first optical splitter. The first optical splitter is configured to transmit the first set of optical pulses to each subsystem in the

first plurality of subsystems. Each subsystem in the first plurality of subsystems is configured to modulate the first set of optical pulses based on the generated digital values and thereby generate a modulated optical pulse stream. A first optical combiner receives and combines the modulated optical pulse stream from each subsystem in the first plurality of subsystems, thereby generating a combined modulated optical pulse stream. A first optical receiver receives the combined modulated optical pulse stream from the first optical combiner. The first optical receiver is configured to generate electrical signals based on the received combined modulated optical pulse stream. (See, e.g., specification at page 6, line 19 to page 9, line 23; Figure 2; reference numbers 200, 204, 206, 210, 212, 214, and 218).

The present invention, as claimed in independent claim 12, provides a system for remotely retrieving data from an array of sensors. The system includes an optical source for generating a stream of optical pulses. An optical splitter splits the stream of optical pulses into a plurality of streams of optical pulses. The system includes a plurality of optical modulators. Each optical modulator is configured to receive one of the plurality of streams of optical pulses. Each optical modulator is configured to receive sensor information from at least one of the sensors. Each optical modulator is configured to modulate the received stream of optical pulses based on the received sensor information and thereby generate a modulated stream of optical pulses. An optical combiner receives a modulated stream of optical pulses from each of the optical modulators and combines the modulated streams of optical pulses into a combined modulated stream of optical pulses. An optical receiver receives the combined modulated stream of optical pulses. (See, e.g., specification at page 6, line 19 to page 9, line 23; Figure 2; reference numbers 200, 204, 208, 210, 212, 214, and 218).

The present invention, as claimed in independent claim 20, provides a method for remotely retrieving data from an array of sensors. The method includes remotely generating a plurality of streams of optical pulses. The plurality of streams of optical pulses are received with a plurality of optical modulators. Each of the received streams of optical pulses is modulated with the plurality of optical modulators based on sensor information generated by the array of sensors, thereby generating a plurality of modulated streams of optical pulses. The plurality of

modulated streams of optical pulses are combined into a combined modulated stream of optical pulses. The combined modulated stream of optical pulses is transmitted. The transmitted combined modulated stream of optical pulses is remotely received. (See, e.g., specification at page 6, line 19 to page 11, line 14; Figures 2-4; reference numbers 204, 208, 304, 408, and 410).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

I. Claims 12, 16-18, 20, and 22-24 stand rejected under 35 U.S.C. §102(a) as being anticipated by Lin et al., "System Design and Optimization of Optical Amplified WDM-TDM Hybrid Polarization-Insensitive Fiber-Optic Michelson Interferometric Sensor", Journal of Lightwave Technology, Vol. 18, No. 3, March 2000 ("Lin").

II. Claims 1 and 5-8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Nelson et al., U.S. Patent No. 4,628,493 ("Nelson") and McArthur et al., U.S. Patent No. 5,272,476 ("McArthur").

III. Claims 2 and 3 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Lin, Nelson, McArthur, and Sonderegger et al., U.S. Patent No. 5,796,504 ("Sonderegger").

IV. Claim 4 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Lin, Nelson, McArthur, and Guy, U.S. Patent No. 6,690,886 ("Guy").

V. Claim 9 stands rejected under U.S.C. §103(a) as being unpatentable over Lin, Nelson, McArthur, and Nakamura et al., U.S. Patent No. 5,784,188 ("Nakamura").

VI. Claims 10 and 11 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Lin, Nelson, McArthur, and Green et al., U.S. Patent No. 6,515,939 ("Green").

VII. Claims 13 and 21 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Nelson.

VIII. Claim 14 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Sonderegger.

IX. Claim 15 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Guy.

X. Claims 19 and 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Nakamura.

ARGUMENT

I. The Applicable Law

"A claim is anticipated if each and every element as set forth in the claim is found, either expressly or inherently described, in a single, prior art reference." *Verdegaal Bros. v. Union Oil Co., of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

The Examiner has the burden under 35 U.S.C. §103 to establish a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Three criteria must be satisfied to establish a *prima facie* case of obviousness. First, the Examiner must show that some objective teaching in the prior art or some knowledge generally available to one of ordinary skill in the art would teach, suggest, or motivate one to modify a reference or to combine the teachings of multiple references. *Id.* Second, the prior art can be modified or combined only so long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Third, the prior art reference or combined prior art references must teach or suggest all of the claim limitations. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). These three criteria are also set forth in §706.02(j) of the M.P.E.P. In performing the obviousness inquiry under 35 U.S.C. §103, the Examiner must avoid hindsight. *In re Bond*, 910 F.2d 831, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990), *reh'g denied*, 1990 U.S. App. LEXIS 19971 (Fed. Cir. 1990).

II. Rejection of Claims 12, 16-18, 20, and 22-24 under 35 U.S.C. §102(a) as being anticipated by Lin.

The Examiner rejected claims 12, 16-18, 20, and 22-24 under 35 U.S.C. §102(a) as being anticipated by Lin et al., Journal of Lightwave Technology publication ("Lin"). Appellants

respectfully submit that Lin does not teach or suggest the invention of independent claims 12 and 20, and the claims depending therefrom.

A. Rejection of Claims 12 and 16-18 under 35 U.S.C. §102(a) as being anticipated by Lin.

Independent claim 12 is directed to a "system for remotely retrieving data from an **array of sensors**" and recites "a plurality of **optical modulators**, each optical modulator configured to receive one of the plurality of streams of optical pulses, each optical modulator configured to receive sensor information from at least one of the sensors, each optical modulator configured to modulate the received stream of optical pulses based on the received sensor information and thereby generate a modulated stream of optical pulses."

The Examiner previously admitted that Lin fails to teach modulators. (Office Action mailed 6/15/04 at page 4). The Examiner then stated in a later Office Action that "Lin et al. teaches in FIG. 1 Michelson interferometric sensors which act as modulators." (Office Action mailed October 18, 2005, at page 2). Applicant addressed this argument in a Response to that Office Action, and addresses it again in the following paragraph.

Independent claim 12 separately recites both an "array of sensors" and "a plurality of optical modulators". If the Examiner contends that the sensors disclosed in Lin correspond to the optical modulators recited in claim 12, then Applicant respectfully submits that Lin does not teach or suggest an array of sensors. If the Examiner contends that the sensors disclosed in Lin correspond to the array of sensors recited in claim 12, then Applicant respectfully submits that Lin does not teach or suggest optical modulators. Lin does not teach or suggest both an array of sensors **and** a plurality of optical modulators as recited in claim 12.

Now, in the Final Office Action, the Examiner stated the following:

> The Applicant argues that if the Examiner contends that the sensors disclosed in Lin correspond to the optical modulators recited in claims 12 and 20, then Lin does not teach or suggest an array of sensors; if the Examiner contends that the sensors disclosed in Lin correspond to the array of sensors recited in claims 12 and 20, then Lin does not teach or suggest optical modulators. The Applicant argues that Lin does not teach or suggest both an array of sensors **and** a plurality of optical modulators as recited in claims 12 and 20. The Examiner

> disagrees. A closer look at FIG. 1 of Lin indicates that an interferometric sensor comprises several parts, namely, two arms (or legs) and a fiber coupler (FC). One of the arms is a reference arm and the other is the senor (sic) part for sensing acoustic pressure. The fiber coupler acts as an interferometer and takes the reflected signals from the reference arm and the sensor arm and generates a phase modulation. That is, the sensor arm of FIG. 1 of Lin corresponds to the sensor recited in claims 12 and 20 and the fiber coupler corresponds to the modulator recited in claims 12 and 20. (Final Office Action at para. no. 13, pages 11-12) (emphasis in original).

Applicant respectfully disagrees with the Examiners statement above that "[o]ne of the arms is a reference arm and the other is the senor (sic) part for sensing acoustic pressure." There is no teaching or suggestion in Lin that either of the arms senses acoustic pressure. In fact, the Examiner has admitted in the Final Office Action that "[t]he differences between Lin et al. and the claimed invention are (a) Lin et al. does not specify the sensors as acoustic sensors . . . ." (Final Office Action at para. no. 4, page 3).

Applicant also respectfully disagrees with the Examiner's statements above that the fiber coupler corresponds to the modulator recited in the claims, and that "[t]he fiber coupler acts as an interferometer and takes the reflected signals from the reference arm and the sensor arm and generates a phase modulation." The Examiner has provided no citation or support for the Examiner's contention that the fiber coupler disclosed in Lin "acts as an interferometer". The Examiner has provided no citation or support for the Examiner's contention that the fiber coupler disclosed in Lin "generates a phase modulation". There is no teaching or suggestion in Lin that the fiber coupler acts as an interferometer, that the fiber coupler generates a phase modulation, or that the fiber coupler performs any functions other than coupling multiple fibers together. The fiber coupler disclosed in Lin is not an "optical modulator". The fiber coupler does not modulate a received stream of optical pulses based on received sensor information.

In view of the above, independent claim 12 is not taught or suggested by Lin. Appellants submit that independent claim 12 is not anticipated by Lin, and respectfully request that the rejection of independent claim 12 under 35 U.S.C. § 102(a) be withdrawn. Since dependent claims 16-18 further define patentably distinct claim 12, and are further distinguishable over the

cited prior art, these dependent claims are believed to be allowable over the cited reference. Appellants submit that dependent claims 16-18 are not anticipated by Lin, and respectfully request that the rejection of dependent claims 16-18 under 35 U.S.C. § 102(a) be withdrawn.

B. Rejection of Claims 20 and 22-24 under 35 U.S.C. §102(a) as being anticipated by Lin.

Independent claim 20 is directed to a "method for remotely retrieving data from an **array of sensors**" and recites "receiving the plurality of streams of optical pulses with a plurality of **optical modulators**" and "modulating each of the received streams of optical pulses with the plurality of optical modulators based on sensor information generated by the array of sensors, and thereby generating a plurality of modulated streams of optical pulses."

As addressed above with respect to claim 12, the Examiner previously admitted that Lin fails to teach modulators. (Office Action mailed 6/15/04 at page 4). The Examiner then stated in a later Office Action that "Lin et al. teaches in FIG. 1 Michelson interferometric sensors which act as modulators." (Office Action mailed October 18, 2005, at page 2). Applicant addressed this argument in a Response to that Office Action, and addresses it again in the following paragraph.

Independent claim 20 separately recites both an "array of sensors" and "a plurality of optical modulators". If the Examiner contends that the sensors disclosed in Lin correspond to the optical modulators recited in claim 20, then Applicant respectfully submits that Lin does not teach or suggest an array of sensors. If the Examiner contends that the sensors disclosed in Lin correspond to the array of sensors recited in claim 20, then Applicant respectfully submits that Lin does not teach or suggest optical modulators. Lin does not teach or suggest both an array of sensors **and** a plurality of optical modulators as recited in claim 20.

Now, in the Final Office Action, the Examiner stated the following:

> The Applicant argues that if the Examiner contends that the sensors disclosed in Lin correspond to the optical modulators recited in claims 12 and 20, then Lin does not teach or suggest an array of sensors; if the Examiner contends that the sensors disclosed in Lin correspond to the array of sensors recited in claims 12 and 20, then Lin does not teach or suggest optical modulators. The

> Applicant argues that Lin does not teach or suggest both an array of sensors **and** a plurality of optical modulators as recited in claims 12 and 20. The Examiner disagrees. A closer look at FIG. 1 of Lin indicates that an interferometric sensor comprises several parts, namely, two arms (or legs) and a fiber coupler (FC). One of the arms is a reference arm and the other is the senor (sic) part for sensing acoustic pressure. The fiber coupler acts as an interferometer and takes the reflected signals from the reference arm and the sensor arm and generates a phase modulation. That is, the sensor arm of FIG. 1 of Lin corresponds to the sensor recited in claims 12 and 20 and the fiber coupler corresponds to the modulator recited in claims 12 and 20. (Final Office Action at para. no. 13, pages 11-12) (emphasis in original).

Applicant respectfully disagrees with the Examiners statement above that "[o]ne of the arms is a reference arm and the other is the senor (sic) part for sensing acoustic pressure." There is no teaching or suggestion in Lin that either of the arms senses acoustic pressure. In fact, the Examiner has admitted in the Final Office Action that "[t]he differences between Lin et al. and the claimed invention are (a) Lin et al. does not specify the sensors as acoustic sensors . . . ." (Final Office Action at para. no. 4, page 3).

Applicant also respectfully disagrees with the Examiner's statements above that the fiber coupler corresponds to the modulator recited in the claims, and that "[t]he fiber coupler acts as an interferometer and takes the reflected signals from the reference arm and the sensor arm and generates a phase modulation." The Examiner has provided no citation or support for the Examiner's contention that the fiber coupler disclosed in Lin "acts as an interferometer". The Examiner has provided no citation or support for the Examiner's contention that the fiber coupler disclosed in Lin "generates a phase modulation". There is no teaching or suggestion in Lin that the fiber coupler acts as an interferometer, that the fiber coupler generates a phase modulation, or that the fiber coupler performs any functions other than coupling multiple fibers together. The fiber coupler disclosed in Lin is not an "optical modulator". The fiber coupler does not modulate a received stream of optical pulses based on received sensor information.

In view of the above, independent claim 20 is not taught or suggested by Lin. Appellants submit that independent claim 20 is not anticipated by Lin, and respectfully request that the rejection of independent claim 20 under 35 U.S.C. § 102(a) be withdrawn. Since dependent

claims 22-24 further define patentably distinct claim 20, and are further distinguishable over the cited prior art, these dependent claims are believed to be allowable over the cited reference. Appellants submit that dependent claims 22-24 are not anticipated by Lin, and respectfully request that the rejection of dependent claims 22-24 under 35 U.S.C. § 102(a) be withdrawn.

III. Rejection of Claims 1 and 5-8 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Nelson and McArthur.

The Examiner rejected claims 1 and 5-8 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Nelson et al, U.S. Patent No. 4,628,493 ("Nelson") and McArthur et al., U.S. Patent No. 5,272,476 ("McArthur"). Appellants submit that the Examiner has not established a *prima facie* case of obviousness of claims 1 and 5-8.

A. Rejection of Claims 1 and 5-7 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Nelson and McArthur.

Claim 1 recites "**a plurality of acoustic sensors** for receiving acoustic information and generating analog signals based on the received acoustic information", "**a first plurality of subsystems** coupled to at least a subset of the plurality of acoustic sensors, the first plurality of subsystems configured to receive the analog signals from the acoustic sensors and generate digital values based on the received analog signals", and "each subsystem in the first plurality of subsystems configured to modulate the first set of optical pulses based on the generated digital values and thereby generate a modulated optical pulse stream."

The Examiner stated with respect to claim 1 that "Lin et al. discloses in FIG. 9 a telemetry system comprising a plurality of sensors arranged as a plurality of sensor arrays . . . a plurality of sensor arrays for modulating the optical pulses . . . ." (Final Office Action at para. no. 4, page 3). For the same reasons as discussed above with reference to claims 12 and 20, Lin fails to teach or suggest the above-quoted limitations of claim 1. If the Examiner contends that the sensors disclosed in Lin correspond to the plurality of subsystems recited in claim 1, then Applicant respectfully submits that Lin does not teach or suggest a plurality of sensors. If the

Examiner contends that the sensors disclosed in Lin correspond to the plurality of sensors recited in claim 1, then Applicant respectfully submits that Lin does not teach or suggest a plurality of subsystems. Lin does not teach or suggest both a plurality of sensors **and** a plurality of subsystems as recited in claim 1. Lin does not teach or suggest a plurality of subsystems that receive analog signals from acoustic sensors, generate digital values based on the received analog signals, and modulate received optical pulses based on the generated digital values and thereby generate a modulated optical pulse stream. Nelson and McArthur also fail to teach or suggest these limitations.

In the Response to Arguments section of the Final Office Action, the Examiner stated the following:

> The Applicant argues that if the Examiner contends that the sensors disclosed in Lin correspond to the plurality of subsystems recited in claim 1, then Lin does not teach or suggest a plurality of sensors; if the Examiner contends that the sensors disclosed in Lin correspond to the plurality of sensors recited in claim 1, then Lin does not teach or suggest a plurality of claim 1 (sic). The Applicant argues that Lin does not teach or suggest both a plurality of sensors **and** a plurality of subsystems as recited in claim 1, and Nelson and McArthur also fail to teach or suggest these limitations. The Examiner disagrees. As indicated above, a sensing arm of an interferometric sensor of Lin corresponds to a sensor of instant claim. Furthermore, Nelson et al., teaches in FIG. 1 telemetry modules correspond to subsystems of instant claim. (Final Office Action at para. no. 13, page 12) (emphasis in original).

In the above block quote, the Examiner did not identify any structure in Lin that allegedly corresponds to the first plurality of subsystems recited in claim 1. Lin does not teach or suggest a plurality of subsystems that receive analog signals from acoustic sensors, generate digital values based on the received analog signals, and modulate received optical pulses based on the generated digital values and thereby generate a modulated optical pulse stream.

The Examiner argues in the above block quote that the telemetry modules disclosed in Nelson correspond to the subsystems recited in claim 1. This argument is contradicted by the Examiner's admission earlier in the Final Office Action that "[t]he modified telemetry system of Lin et al. and Nelson et al. still fails to teach a plurality of subsystems for generating digital

values based on analog signals received by the sensors." (Final Office Action at para. no. 4, page 4). Like the Lin reference, Nelson also does not teach or suggest a plurality of subsystems that receive analog signals from acoustic sensors, generate digital values based on the received analog signals, and modulate received optical pulses based on the generated digital values and thereby generate a modulated optical pulse stream.

The Examiner has also not identified any structure in McArthur that allegedly corresponds to the first plurality of subsystems recited in claim 1. Like the Lin and Nelson references, McArthur also does not teach or suggest a plurality of subsystems that receive analog signals from acoustic sensors, generate digital values based on the received analog signals, and modulate received optical pulses based on the generated digital values and thereby generate a modulated optical pulse stream.

There is also no suggestion to combine the cited references. The Federal Circuit has stated that "there must be some suggestion, motivation, or teaching in the prior art that would have led a person of ordinary skill in the art to select the references and combine them in the way that would produce the claimed invention." *Karsten Manufacturing Corp. v. Cleveland Golf Co.*, 58 U.S.P.Q.2d 1286, 1293 (CAFC 2001). The Examiner has not identified any suggestion in the cited references to modify the polarization-insensitive fiber-optic Michelson interferometric sensor (PIFOMIS) system disclosed in Lin to include any particular subsystem of Nelson or McArthur. In addition, these references disclose very different types of systems, and such a modification would appear to change the principle of operation of the system disclosed in Lin, as well as require a substantial reconstruction and redesign of the system. The MPEP states that "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." MPEP §2143.01, citing *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). The MPEP also states that, in the *Ratti* case, "[t]he court reversed the rejection holding the 'suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well

as a change in the basic principle under which the [primary reference] construction was designed to operate." MPEP §2143.01, citing *In re Ratti*, 270 F.2d at 813, 123 USPQ at 352.

In view of the above, independent claim 1 is not taught or suggested by Lin, Nelson, and McArthur, either alone, or in combination. Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness of claim 1, and the rejection of claim 1 under 35 U.S.C. § 103(a) should be withdrawn. Dependent claims 5-7, which further limit patentably distinct claim 1, are also believed to be allowable over the cited references. Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness of claims 5-7, and the rejection of claims 5-7 under 35 U.S.C. § 103(a) should be withdrawn.

B. Rejection of Claim 8 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Nelson and McArthur.

Dependent claim 8 recites "wherein each subsystem in the first plurality of subsystems includes an optical modulator for modulating the first set of optical pulses based on the generated digital values." As discussed above with respect to claims 12 and 20, Lin does not teach or suggest both an array of sensors **and** a plurality of optical modulators. For at least the reasons discussed above with reference to claims 12 and 20, the cited references do not teach or suggest the limitations of claim 8.

Dependent claim 8, which further limits patentably distinct claim 1, is believed to be allowable over the cited references. Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness of claim 8, and the rejection of claim 8 under 35 U.S.C. § 103(a) should be withdrawn.

IV. Rejection of Claims 2 and 3 under 35 U.S.C. §103(a) as being unpatentable over Lin, Nelson, McArthur, and Sonderegger.

Dependent claims 2 and 3, which further limit patentably distinct claim 1, are also believed to be allowable over the cited references. Appellants respectfully submit that the

Examiner has not established a *prima facie* case of obviousness of claims 2 and 3, and the rejection of claims 2 and 3 under 35 U.S.C. § 103(a) should be withdrawn.

V. Rejection of Claim 4 under 35 U.S.C. §103(a) as being unpatentable over Lin, Nelson, McArthur, and Guy.

Dependent claim 4, which further limits patentably distinct claim 1, is believed to be allowable over the cited references. Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness of claim 4, and the rejection of claim 4 under 35 U.S.C. § 103(a) should be withdrawn.

VI. Rejection of Claim 9 under 35 U.S.C. §103(a) as being unpatentable over Lin, Nelson, McArthur and Nakamura.

Dependent claim 9 recites "wherein each optical modulator modulates the first set of optical pulses by passing and blocking optical pulses in the first set of optical pulses." With respect to claim 9, the Examiner stated that:

> The difference between Lin et al., Nelson et al. and McArthur et al. and the claimed invention is that Lin et al., Nelson et al. and McArthur et al. do not teach a modulator that modulates by passing and blocking optical signal. However, it is well known in the art that electro-absorption (EA) modulators are widely used for modulating optical signal by blocking (absorbing) or passing optical signal. For example, Nakamura et al. disclosed in FIG. 1 an EA modulator. (Final Office Action, para. no. 7, pages 6-7).

First, the Examiner has not cited anything in Nakamura that teaches or suggests that the electro-absorption modulator (EA modulator) disclosed therein is configured to modulate a set of optical pulses by passing and blocking optical pulses. Second, as addressed in further detail below, there is no suggestion to combine the cited references in the manner proposed by the Examiner.

In the Response to Arguments section of the Final Office Action, the Examiner stated the following:

> Regarding claim 9, the Applicant argues that there is no suggestion to combine the cited references. The Examiner disagrees. As stated above in the rejection, Nakamura et al., teaches in col. 1, ll. 15-21 that EA modulator is effective for transmitting a modulated signal in a wider frequency band over a longer distance without using any transponders. One of ordinary skill in the art would have been motivated to combine the teaching of Nakamura et al., with the modified telemetry system of Lin et al., Nelson et al., and McArthur et al., because of such desirable feature of EA modulator.
>
> The Applicant also suggests that there is lack of evidence that an EA modulator modulates by passing or block optical pulses. Nakamura et al., may not teach the operation characteristic of EA modulator. However, it is well known to one of ordinary skill in the art. For example, Suzuki et al. (U.S. Patent No. 5,889,607), teaches in FIG. 2 that when the applied voltage is above -4 volts, the modulator passes light and when the applied voltage is below -4 volts, it blocks light transmission. (Final Office Action at para. no. 13, pages 12-13).

As the Examiner indicated in the above block quote, Nakamura discloses in the Background of the Invention section that an EA modulator is effective for transmitting a modulated signal in a wider frequency band over a longer distance without using any transponders. (Nakamura at col. 1, lines 15-21). The Examiner is apparently relying on this statement to combine any arbitrary disclosure in the references in any arbitrary manner, which is clearly contrary to established precedent. The Federal Circuit has stated that "there must be some suggestion, motivation, or teaching in the prior art that would have led a person of ordinary skill in the art to select the references and combine them in the way that would produce the claimed invention." *Karsten Manufacturing Corp. v. Cleveland Golf Co.*, 58 U.S.P.Q.2d 1286, 1293 (CAFC 2001). The Examiner has acknowledged that Lin, Nelson, and McArthur do not teach a modulator that modulates by passing and blocking optical signals. (Final Office Action at para. no. 7, page 7). Lin, Nelson, and McArthur do not include any teaching or suggestion that the systems disclosed therein could or should be modified to include modulators that pass and block received optical pulses, nor do Lin, Nelson, and McArthur include any suggestion that it would be desirable to add modulators that pass and block received optical pulses. There is no teaching or suggestion in Nakamura that the disclosed EA modulator could or should be used in a polarization-insensitive fiber-optic Michelson interferometric sensor (PIFOMIS) system like

that disclosed in Lin. Rather, Nakamura discloses that the EA modulator is configured to be used in the digital transmission of moving pictures (See, e.g., Nakamura at col. 5, lines 9-13 and lines 63-67).

In addition, as Applicant has previously pointed out, the Examiner has not cited anything in Nakamura that teaches or suggests that the electro-absorption modulator (EA modulator) disclosed therein is configured to modulate a set of received optical pulses by passing and blocking optical pulses. In response, the Examiner has cited an additional reference, Suzuki et al. (U.S. Patent No. 5,889,607), and stated that Suzuki teaches in FIG. 2 that when the applied voltage is above -4 volts, the modulator passes light and when the applied voltage is below -4 volts, it blocks light transmission. Figure 2 of Suzuki is a diagram illustrating the operation of an optical pulse **generating** device that uses the optical modulator disclosed in Suzuki. (Suzuki at col. 4, lines 16-18) (emphasis added). There is no teaching or suggestion in Suzuki that the optical modulator of the pulse **generating** device modulates a set of optical pulses that are **transmitted to the modulator** by passing and blocking the received optical pulses. The cited references do not teach or suggest an optical modulator that modulates a received set of optical pulses based on digital sensor values by passing and blocking optical pulses.

Furthermore, the proposed modification to Lin by adding the electro-absorption (EA) modulators disclosed in Nakamura to the polarization-insensitive fiber-optic Michelson interferometric sensor (PIFOMIS) system disclosed in Lin would change the principle of operation of the system disclosed in Lin, as well as require a substantial reconstruction and redesign of the system. The MPEP states that "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." MPEP §2143.01, citing *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). The MPEP also states that, in the *Ratti* case, "[t]he court reversed the rejection holding the 'suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principle under which

the [primary reference] construction was designed to operate." MPEP §2143.01, citing *In re Ratti*, 270 F.2d at 813, 123 USPQ at 352.

Also, the Examiner has indicated that the fiber couplers disclosed in Lin correspond to the optical modulators recited in the claims. (See, e.g., Final Office Action at para. no. 13, pages 11-12. Thus, it appears that the Examiner is proposing that the fiber couplers disclosed in Lin would be replaced by the EA modulators disclosed in Nakamura. Such a modification would appear to render inoperable the system disclosed in Lin.

Dependent claim 9, which further limits patentably distinct claim 1, and is further distinguishable over the cited references, is believed to be allowable over the cited references. Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness of claim 9, and the rejection of claim 9 under 35 U.S.C. § 103(a) should be withdrawn.

VII. Rejection of Claims 10 and 11 under 35 U.S.C. §103(a) as being unpatentable over Lin, Nelson, McArthur, and Green.

Dependent claims 10 and 11, which further limit patentably distinct claim 1, are also believed to be allowable over the cited references. Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness of claims 10 and 11, and the rejection of claims 10 and 11 under 35 U.S.C. § 103(a) should be withdrawn.

VIII. Rejection of Claims 13 and 21 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Nelson.

Dependent claims 13 and 21, which further limit patentably distinct claims 12 and 20, respectively, are also believed to be allowable over the cited references. Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness of claims 13 and 21, and the rejection of claims 13 and 21 under 35 U.S.C. § 103(a) should be withdrawn.

IX. Rejection of Claim 14 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Sonderegger.

Dependent claim 14, which further limits patentably distinct claim 12, is believed to be allowable over the cited references. Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness of claim 14, and the rejection of claim 14 under 35 U.S.C. § 103(a) should be withdrawn.

X. Rejection of Claim 15 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Guy.

Dependent claim 15, which further limits patentably distinct claim 12, is believed to be allowable over the cited references. Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness of claim 15, and the rejection of claim 15 under 35 U.S.C. § 103(a) should be withdrawn.

XI. Rejection of Claims 19 and 25 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Nakamura.

Claims 19 and 25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Nakamura. Appellants submit that the Examiner has not established a *prima facie* case of obviousness of claims 19 and 25.

A. Rejection of Claim 19 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Nakamura.

Claim 19 depends from claim 12 and recites "wherein each optical modulator modulates the received stream of optical pulses by passing and blocking optical pulses in the received stream." With respect to claim 19, the Examiner stated that:

> The difference between Lin et al. and the claimed invention is that Lin et al. does not teach to modulate received optical pulses by passing and block optical pulses. However, it is well known in the art that electro-absorption (EA) modulators are widely used for modulating optical signal by blocking (absorbing) or passing optical signal. For example, Nakamura et al. discloses in FIG. 1 an EA modulator. (Final Office Action at para. no. 12, pages 10-11).

As previously discussed with reference to claim 9, the Examiner has not cited anything in Nakamura that teaches or suggests that the electro-absorption modulator (EA modulator) disclosed therein is configured to modulate a received set of optical pulses by passing and blocking optical pulses, and there is no suggestion to combine the cited references in the manner proposed by the Examiner. In addition, the proposed modification to Lin would also change the principle of operation disclosed in Lin, as well as require a substantial reconstruction and redesign of the system disclosed in Lin. See MPEP §2143.01.

For at least the reasons set forth above with respect to claim 9, dependent claim 19, which further limits patentably distinct claim 12, and is further distinguishable over the cited references, is believed to be allowable over the cited references. Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness of claim 19, and the rejection of claim 19 under 35 U.S.C. § 103(a) should be withdrawn.

B. Rejection of Claim 25 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Nakamura.

Claim 25 depends from claim 20 and recites "wherein each of the received streams of optical pulses is modulated by passing and blocking optical pulses in the received streams." With respect to claim 25, the Examiner stated that:

> The difference between Lin et al. and the claimed invention is that Lin et al. does not teach to modulate received optical pulses by passing and block optical pulses. However, it is well known in the art that electro-absorption (EA) modulators are widely used for modulating optical signal by blocking (absorbing) or passing optical signal. For example, Nakamura et al. discloses in FIG. 1 an EA modulator. (Final Office Action at para. no. 12, pages 10-11).

As previously discussed with reference to claim 9, the Examiner has not cited anything in Nakamura that teaches or suggests that the electro-absorption modulator (EA modulator) disclosed therein is configured to modulate a received set of optical pulses by passing and blocking optical pulses, and there is no suggestion to combine the cited references in the manner

proposed by the Examiner. In addition, the proposed modification to Lin would also change the principle of operation disclosed in Lin, as well as require a substantial reconstruction and redesign of the system disclosed in Lin. See MPEP §2143.01.

For at least the reasons set forth above with respect to claim 9, dependent claim 25, which further limits patentably distinct claim 20, and is further distinguishable over the cited references, is believed to be allowable over the cited references. Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness of claim 25, and the rejection of claim 25 under 35 U.S.C. § 103(a) should be withdrawn.

CONCLUSION

For the above reasons, Appellants respectfully submit that the cited references neither anticipate nor render obvious claims of the pending Application. The pending claims distinguish over the cited references, and therefore, Appellants respectfully submit that the rejections must be withdrawn, and respectfully request the Examiner be reversed and claims 1-25 be allowed.

Any inquiry regarding this Response should be directed to Jeff A. Holmen at Telephone No. (612) 573-0178, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

Appeal Brief to the Board of Patent Appeals and Interferences
Applicant: VanWinkle T. Townsend
Serial No.: 09/847,751
Filed: May 2, 2001
Docket No.: L250.109.101 (FE-00494)
Title: TELEMETRY SYSTEM AND METHOD FOR ACOUSTIC ARRAYS

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CERTIFICATE UNDER 37 C.F.R. 1.8:

The undersigned hereby certifies that this paper or papers, as described herein, are being transmitted via facsimile to Facsimile No. (571) 273-8300 on this 3rd day of August, 2006.

By: _____
Name: Jeff A. Holmen

CLAIMS APPENDIX

1.(Original) A telemetry system comprising:

a plurality of acoustic sensors for receiving acoustic information and generating analog signals based on the received acoustic information;

a first plurality of subsystems coupled to at least a subset of the plurality of acoustic sensors, the first plurality of subsystems configured to receive the analog signals from the acoustic sensors and generate digital values based on the received analog signals;

a first optical splitter;

a first optical transmitter for transmitting a first set of optical pulses to the first optical splitter, the first optical splitter configured to transmit the first set of optical pulses to each subsystem in the first plurality of subsystems, each subsystem in the first plurality of subsystems configured to modulate the first set of optical pulses based on the generated digital values and thereby generate a modulated optical pulse stream;

a first optical combiner for receiving and combining the modulated optical pulse stream from each subsystem in the first plurality of subsystems, thereby generating a combined modulated optical pulse stream; and

a first optical receiver for receiving the combined modulated optical pulse stream from the first optical combiner, the first optical receiver configured to generate electrical signals based on the received combined modulated optical pulse stream.

2.(Original) The telemetry system of claim 1, wherein the telemetry system is an underwater acoustic telemetry system for use in a submersible vehicle.

3.(Original) The telemetry system of claim 2, wherein the plurality of acoustic sensors, the first plurality of subsystems, the first optical splitter, and the first optical combiner are

configured to be positioned outboard of the submersible vehicle, and the first optical transmitter and the first optical receiver are configured to be positioned inboard of the submersible vehicle.

4.(Original) The telemetry system of claim 1, wherein the first optical splitter is a passive optical splitter, and wherein the first optical combiner is a passive optical combiner.

5.(Original) The telemetry system of claim 1, wherein a duty cycle of the first set of optical pulses is about 1/(2N), where N represents the number of subsystems in the first plurality of subsystems.

6.(Original) The telemetry system of claim 1, wherein the combined modulated optical pulse stream is in a time division multiplexed format.

7.(Original) The telemetry system of claim 1, wherein the combined modulated optical pulse stream is in a time division multiplexed format and a wavelength division multiplexed format.

8.(Original) The telemetry system of claim 1, wherein each subsystem in the first plurality of subsystems includes an optical modulator for modulating the first set of optical pulses based on the generated digital values.

9.(Original) The telemetry system of claim 8, wherein each optical modulator modulates the first set of optical pulses by passing and blocking optical pulses in the first set of optical pulses.

10.(Original) The telemetry system of claim 1, and further comprising:

a second plurality of subsystems coupled to at least a subset of the plurality of acoustic sensors, the second plurality of subsystems configured to receive the analog signals from the acoustic sensors and generate digital values based on the received analog signals;

a second optical splitter;

a second optical transmitter for transmitting a second set of optical pulses to the second optical splitter, the second optical splitter configured to transmit the second set of optical pulses to each subsystem in the second plurality of subsystems, each subsystem in the second plurality of subsystems configured to modulate the second set of optical pulses based on the generated digital values and thereby generate a modulated optical pulse stream;

a second optical combiner for receiving and combining the modulated optical pulse stream from each subsystem in the second plurality of subsystems, thereby generating a combined modulated optical pulse stream; and

a second optical receiver for receiving the combined modulated optical pulse stream from the second optical combiner, the second optical receiver configured to generate electrical signals based on the received combined modulated optical pulse stream.

11.(Original) The telemetry system of claim 1, and further comprising:

a second plurality of subsystems coupled to at least a subset of the plurality of acoustic sensors, the second plurality of subsystems configured to receive the analog signals from the acoustic sensors and generate digital values based on the received analog signals;

a second optical splitter;

a second optical transmitter for transmitting a second set of optical pulses to the second optical splitter, the second set of optical pulses having a different wavelength than the first set of optical pulses, the second optical splitter configured to transmit the second set of optical pulses to each subsystem in the second plurality of subsystems, each subsystem in the second plurality of subsystems configured to modulate the second set of optical pulses based on the generated digital values and thereby generate a modulated optical pulse stream; and

the first optical combiner configured to receive and combine the modulated optical pulse stream from each subsystem in the first plurality of subsystems and the second plurality of subsystems, thereby generating a combined modulated optical pulse stream, the combined modulated optical pulse stream being in a time division multiplexed format and a wavelength division multiplexed format.

12.(Original) A system for remotely retrieving data from an array of sensors, the system comprising:

an optical source for generating a stream of optical pulses;

an optical splitter for splitting the stream of optical pulses into a plurality of streams of optical pulses;

a plurality of optical modulators, each optical modulator configured to receive one of the plurality of streams of optical pulses, each optical modulator configured to receive sensor information from at least one of the sensors, each optical modulator configured to modulate the received stream of optical pulses based on the received sensor information and thereby generate a modulated stream of optical pulses;

an optical combiner for receiving a modulated stream of optical pulses from each of the optical modulators and combining the modulated streams of optical pulses into a combined modulated stream of optical pulses; and

an optical receiver for receiving the combined modulated stream of optical pulses.

13.(Original) The system of claim 12, wherein the array of sensors is an array of acoustic sensors.

14.(Original) The system of claim 12, wherein the system is an underwater acoustic telemetry system for use in a submersible vehicle.

15.(Original) The system of claim 12, wherein the optical splitter is a passive optical splitter, and wherein the optical combiner is a passive optical combiner.

16.(Original) The system of claim 12, wherein a duty cycle of the stream of optical pulses is about 1/(2N), where N represents the number of optical modulators.

17.(Original) The system of claim 12, wherein the combined modulated stream of optical pulses is in a time division multiplexed format.

18.(Original) The system of claim 12, wherein the combined modulated stream of optical pulses is in a time division multiplexed format and a wavelength division multiplexed format.

19.(Original) The system of claim 12, wherein each optical modulator modulates the received stream of optical pulses by passing and blocking optical pulses in the received stream.

20.(Original) A method for remotely retrieving data from an array of sensors, the method comprising:

remotely generating a plurality of streams of optical pulses;

receiving the plurality of streams of optical pulses with a plurality of optical modulators;

modulating each of the received streams of optical pulses with the plurality of optical modulators based on sensor information generated by the array of sensors, and thereby generating a plurality of modulated streams of optical pulses;

combining the plurality of modulated streams of optical pulses into a combined modulated stream of optical pulses;

transmitting the combined modulated stream of optical pulses; and

remotely receiving the transmitted combined modulated stream of optical pulses.

21.(Original) The method of claim 20, wherein the array of sensors is an array of acoustic sensors.

22.(Original) The method of claim 20, wherein a duty cycle of the plurality of streams of optical pulses is about 1/(2N), where N represents the number of optical modulators.

23.(Original) The method of claim 20, wherein the combined modulated stream of optical pulses is in a time division multiplexed format.

24.(Original) The method of claim 20, wherein the combined modulated stream of optical pulses is in a time division multiplexed format and a wavelength division multiplexed format.

25.(Original) The method of claim 20, wherein each of the received streams of optical pulses is modulated by passing and blocking optical pulses in the received streams.

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EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.